



# Pyrethroid Benefits & Science

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Presented To Central Valley Regional Water Quality Control Board

By

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On Behalf of

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# About Pyrethroids

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- PWG is an industry group comprised of pyrethroid manufacturers dedicated to research and stewardship
- PWG has extensively researched
  - From data summaries to modeling to lab to field monitoring studies
  - Have worked to address questions from the regulatory and broader community
- Have been in use for over 35 years
- Most widely used urban insecticides
- Have a favorable human health profile

# Benefits

- Protects Public Health
  - Helps Control Pests that Transmit Serious Illnesses
    - Zika Virus
    - West Nile Virus
    - Malaria
- Helps Control Pests
  - Parasitic: Lice, Bedbugs
  - Nuisance: Cockroaches, ants, spiders
  - Property Damage: Termites
- Food Crops
  - Control of wide range of pests



# Examples of PWG Research

## PWG Pathway ID Study

- Validated the effectiveness of revised label restrictions and DPR regulations to substantially mitigate pyrethroid runoff
  - 40-fold reduction**



## Biomonitoring Studies

- Pyrethroids generally not the primary stressor impacting the benthic community
- Over the course of 10 years, Pleasant Grove Creek showing a declining trend of pyrethroids concentrations
- Hall, Anderson, and Killen, Arch Environ Contam Toxicol (2016) 70:332–340

# Questions raised by Water Board Members February 2016

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- Food Chain Interactions
- Bioaccumulation
- Bioagnification
- Sublethal effects
- Sediment ingestion

# Food Chain Interactions

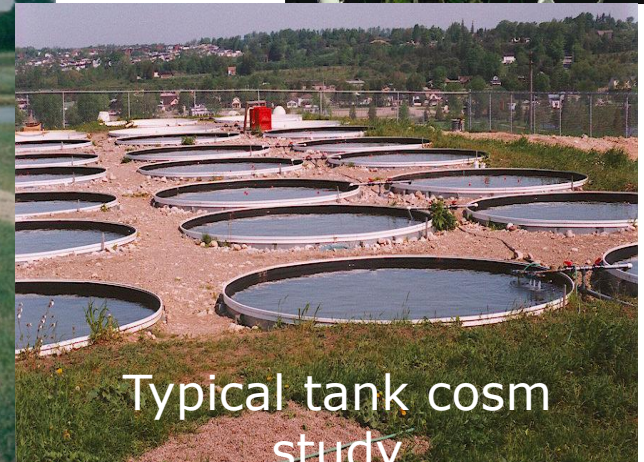
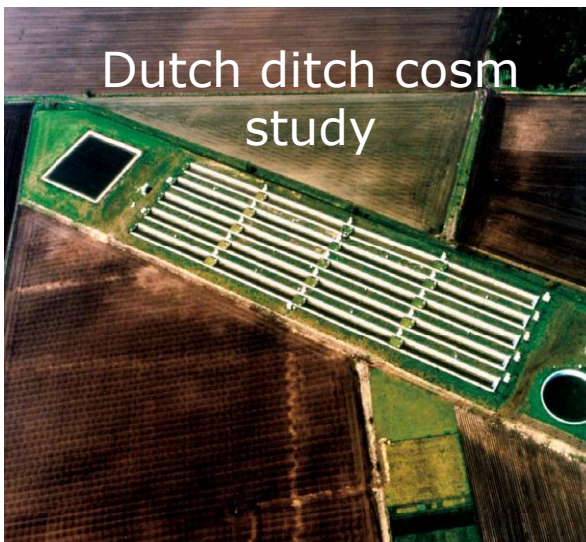
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- Most fish are opportunistic feeders
  - they feed on whatever species are most abundant
- While a few crustacean species (e.g. lab-reared *Hyaella azteca*) are extremely sensitive to pyrethroids, other crustaceans as well as insects, worms, and mollusks are much less sensitive
- The likelihood of fish survival, growth, and reproduction being affected by small changes in overall invertebrate abundance is very low



# Evidence from mesocosm studies

- More than 50 mesocosm studies with pyrethroids show that effects of realistic exposure levels on community structure and productivity are minimal.



# Bioaccumulation/Biomagnification

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- Despite being highly adsorptive, pyrethroids do not bioaccumulate significantly in aquatic organisms
- Unlike some legacy highly adsorptive chemicals, pyrethroids are metabolized and depurated rapidly therefore bioconcentration is  $<1000$ 
  - the usual criterion for bioaccumulative compounds.
- In addition, when modeled using EPA's standard tools, BCFs are generally predicted to be less than 1000
- Pyrethroids do not bioaccumulate because they are metabolized and excreted by organisms
- Because pyrethroids do not accumulate in aquatic organisms, they do not biomagnify through the food chain



# Sublethal effects of pyrethroids are accounted for in standard risk assessments

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- A wide variety of sublethal effects on aquatic organisms have been studied with pyrethroids
  - From biochemical to behavioral
- Most sublethal effects have not been quantitatively linked to survival, growth, and reproduction
- Concentrations reported to cause sublethal effects are similar to standard acute and chronic toxicity endpoints
  - Concentrations are significantly higher than the proposed trigger values.

# **Sediment ingestion is not a significant route of exposure of aquatic organisms to pyrethroids**

- Equilibrium partitioning (EqP) theory: toxicity of hydrophobic chemicals is caused by freely dissolved chemical in the pore water (ie. Bioavailability)
- Applicability of EqP to pyrethroids has been well established
- These observations imply that pyrethroids sorbed to sediment are not a significant source of exposure

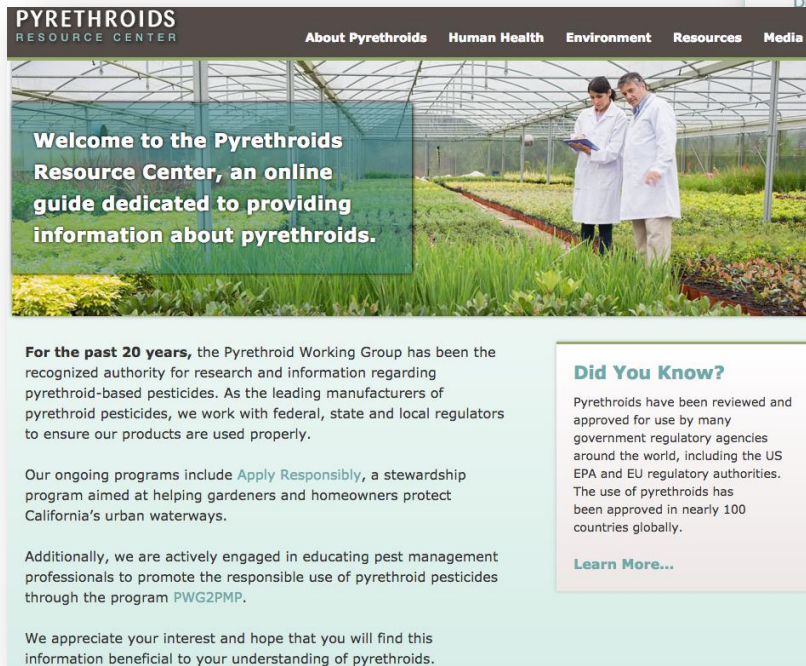
# Summary

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- Pyrethroids **do not** bioaccumulate significantly or biomagnify through the food chain
- Sublethal effects are accounted for in standard risk assessments
- Sediment ingestion is not a significant route of exposure for aquatic organisms.
- Bioavailability is a critical consideration in establishing and interpreting WQC for pyrethroids.

# Pyrethroids Resource Website

- Developing an online resource for information seekers interested in learning more about pyrethroids
- Planned launch within the month (September 2016)



**PYRETHROIDS**  
RESOURCE CENTER

About Pyrethroids Human Health Environment Resources Media

**Welcome to the Pyrethroids Resource Center, an online guide dedicated to providing information about pyrethroids.**

For the past 20 years, the Pyrethroid Working Group has been the recognized authority for research and information regarding pyrethroid-based pesticides. As the leading manufacturers of pyrethroid pesticides, we work with federal, state and local regulators to ensure our products are used properly.

Our ongoing programs include **Apply Responsibly**, a stewardship program aimed at helping gardeners and homeowners protect California's urban waterways.

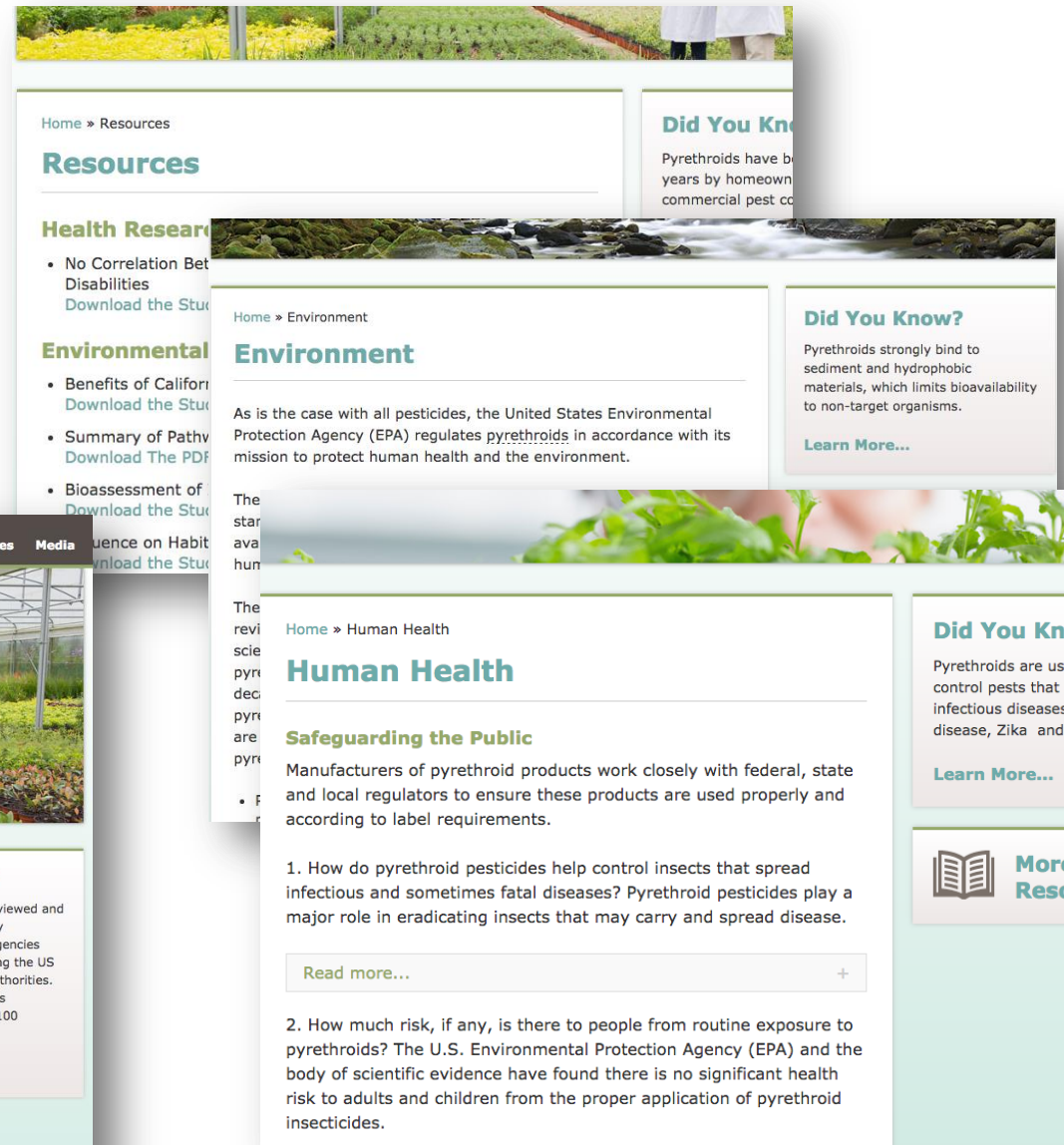
Additionally, we are actively engaged in educating pest management professionals to promote the responsible use of pyrethroid pesticides through the program **PWG2PMP**.

We appreciate your interest and hope that you will find this information beneficial to your understanding of pyrethroids.

**Did You Know?**

Pyrethroids have been reviewed and approved for use by many government regulatory agencies around the world, including the US EPA and EU regulatory authorities. The use of pyrethroids has been approved in nearly 100 countries globally.

[Learn More...](#)



Home » Resources

## Resources

### Health Research

- No Correlation Between Pyrethroids and Disabilities  
[Download the Study](#)

### Environmental

- Benefits of California Pyrethroids  
[Download the Study](#)
- Summary of Pathways of Pyrethroids in the Environment  
[Download The PDF](#)
- Bioassessment of Pyrethroids in the Environment  
[Download the Study](#)

**Did You Know?**

Pyrethroids have been used for over 50 years by homeowners and commercial pest control professionals.

[Learn More...](#)

Home » Environment

## Environment

As is the case with all pesticides, the United States Environmental Protection Agency (EPA) regulates pyrethroids in accordance with its mission to protect human health and the environment.

[Learn More...](#)

Home » Human Health

## Human Health

### Safeguarding the Public

Manufacturers of pyrethroid products work closely with federal, state and local regulators to ensure these products are used properly and according to label requirements.

1. How do pyrethroid pesticides help control insects that spread infectious and sometimes fatal diseases? Pyrethroid pesticides play a major role in eradicating insects that may carry and spread disease.

[Read more...](#)


2. How much risk, if any, is there to people from routine exposure to pyrethroids? The U.S. Environmental Protection Agency (EPA) and the body of scientific evidence have found there is no significant health risk to adults and children from the proper application of pyrethroid insecticides.

[Read more...](#)

**Did You Know?**

Pyrethroids are used globally to control pests that may carry infectious diseases, including malaria, dengue fever, Zika and West Nile virus.

[Learn More...](#)

 **More Resources**

# Input on the Strawman Regulatory Approach

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- Appreciate efforts to engage stakeholders
- Appreciate alternative approaches for implementation of water quality criteria
- Prefer use of 5<sup>th</sup> percentile triggers over 1<sup>st</sup> percentile values
- Support consideration of bioavailability
- Support phased approach



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# QUESTIONS?